PROBLEMS FOR SOLUTION.

ARITHMETIC.

158. Proposed by JAMES F. LAWRENCE, A. B., Professor of Mathematics, Rogers Academy, Rogers, Ark.

My agent sold pork at 5% commission; increasing the proceeds by \$20, I ordered the purchase of flour at 3% commission; after which flour rose 9%, my whole gain was \$40. What did he sell the pork for?

159. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

The amount of tax assessed on the property of a city is T,=\$145850; and the treasurer was allowed a fee of $m\%$,=$\frac{3}{4}\%$, for collection. If $n\%$,=10%, of the tax was uncollectible, what were the net proceeds of the tax?

ALGEBRA.

153. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics in The Temple College, Philadelphia, Pa.

If $x=\Sigma_0^\infty e^{-k[t+(2a\pi/h)]}\sin n\left(t+\frac{2a\pi}{h}\right)$, find value of x freed from Σ_0^∞.

154. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Deduce the Sylvestrian Reciprocant from $ax^3+3bx^2y^2+ay^3+d=0$.

GEOMETRY.

187. Proposed by R. TUCKER, M. A.

AD, BE, CF are the altitudes of the triangle ABC; k_1, k_1'; k_2, k_2'; k_3, k_3' are the S points of the triangles EAB, FCA; FBC, DAB; DCA, EBC, respectively; prove that $k_3'k_1=k_1'k_2=k_2'k_3=R\sin A\sin B\sin C$. ρ_1, ρ_1'; ρ_2, ρ_2'; ρ_3, ρ_3' are the Brocard radii of the above triangles, prove that (1)$\rho_1\rho_2\rho_3=\rho_1'\rho_2'\rho_3'$; (2) $(\rho_2'^2-\rho_3^2)/a^2+(\rho_3'^2-\rho_1^2)/b^2+(\rho_1'^2-\rho_2^2)/c^2=\frac{3}{4}$; (3) the sets of 4 Brocard-points for the above pairs of triangles are concyclic (on three circles); (4) the tangent from any one of the right angles of the above triangles to the Brocard circle of the triangle is a mean proportional between the tangents to the same circle from the remaining (two) angles.

188. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, Gloucestershire, England.

$ABCD$ is a quadrilateral whose diagonal triangle is PQR, P on AD and R on AB. PQ meets AB in Z. If C moves along PB what will happen to Z?